



Early Journal Content on JSTOR, Free to Anyone in the World

This article is one of nearly 500,000 scholarly works digitized and made freely available to everyone in the world by JSTOR.

Known as the Early Journal Content, this set of works include research articles, news, letters, and other writings published in more than 200 of the oldest leading academic journals. The works date from the mid-seventeenth to the early twentieth centuries.

We encourage people to read and share the Early Journal Content openly and to tell others that this resource exists. People may post this content online or redistribute in any way for non-commercial purposes.

Read more about Early Journal Content at <http://about.jstor.org/participate-jstor/individuals/early-journal-content>.

JSTOR is a digital library of academic journals, books, and primary source objects. JSTOR helps people discover, use, and build upon a wide range of content through a powerful research and teaching platform, and preserves this content for future generations. JSTOR is part of ITHAKA, a not-for-profit organization that also includes Ithaka S+R and Portico. For more information about JSTOR, please contact support@jstor.org.

Journal of the Society of Arts.

FRIDAY, OCTOBER 24, 1862.

COUNCIL.

The following Institutions have been taken into Union since the last announcement :—

Banbridge, Literary and Mutual Improvement Society.
 Bilton, Institute.
 Dudley, Mechanics' Institution.
 Glasgow, Evening Science Classes, Carlton-place Secu-
 lar School.
 Westminster, Working Men's Club and Reading Room.

INTERNATIONAL EXHIBITION OF 1862.

REPORTS OF THE JURIES.

The Council of the Society of Arts have felt the importance of having some permanent and authoritative Record of the International Exhibition, and finding that Her Majesty's Commissioners have provided only for the publication of the awards of the Juries, but not of their Reports descriptive of the Progress of Industry since the Exhibition of 1851, the Council have undertaken this work, with the co-operation of Her Majesty's Commissioners and of the Juries,

and have placed the matter in charge of Dr. Lyon Playfair, the Special Commissioner of the Juries.

The Reports will be published in super royal octavo, to range with the one-volume Jury Reports of 1851. The price of the volume, bound in cloth, to Members of the Society of Arts, to Jurors, and Guarantors, is fixed at 10s. ; to other persons, 15s. If bound in morocco, 7s. 6d. additional in each case.

Forms of application for copies have been issued to Members of the Society, to Jurors, and to Guarantors.

It was the intention of the Council to issue the volume complete in the early part of September, but as several of the Reports have not yet been received by Her Majesty's Commissioners, the completion of the entire work has been unexpectedly delayed; the Council, however, unwilling to defer the publication of the Reports already completed, have issued to the subscribers those that have been received up to the present time. When all the Reports are delivered, the parts now issued to subscribers will be exchanged, if uninjured, for the perfect volume, bound or unbound, as desired. Individual reports are sold separately; for prices see advertisement.

INTERNATIONAL EXHIBITION OF 1862.—VISITS OF SCHOOLS.

The following is a continuation of the Schools reported to Her Majesty's Commissioners as having entered the Building from the 13th to the 16th of October :—

DATE.	FROM WHAT LOCALITY.	NAME OF SCHOOL.	BY WHOM SENT.	No. of Children from each School.	Total each day.
Oct. 13	Northwick-terrace ...	Private	Mrs. H. Stewart. ...	15	231
" "	Banstead	National	Subscription	58	
" "	Northants	Lowick Endowed ...	W. B. Stopford, Esq. ...	18	
" "	Lewisham, Kent. ...	Congregational... ..	Subscription	25	
" "	Kent	Broadstairs... ..	Rev. E. F. Newell ...	21	
" "	Saffron-hill	Sunday.	Miss Pullen.	10	
" "	Wapping	St. John's Parochial. ...	Subscription	63	
" "	{ Merrou, near } Guildford. ... }	Parochial	J. W. Thrupp, Esq... ..	21	
" 14	Spitalfields	Christ Church	Rev. J. Peterson. ...	110	
" "	Richmond	St. John's District ...	Subscription	32	
" "	Lambeth	All Saints' National... ..	Messrs. T. and C. Lucas... ..	120	533
" "	Hatfield	Woodhill	Managers	27	
" "	Bishopsgate-street ...	Sabbath and Evening Adult ...	Lady de Rothschild... ..	33	
" "	Windsor	St. Mark's... ..	G. Moffatt, Esq., M.P. ...	109	
" "	East Hendred	Church	Rev. A. Pott	15	
" "	Clapham	Parochial	Rev. W. H. W. A. Bowyer.	28	
" "	Chiswick	National	Miss Hamilton	41	
" "	Bayswater	St. Matthew's Orphans Home..	Miss Green.	18	
" 15	Richmond	St. John's... ..	Subscription	25	
" "	Chelsea	St. Luke's... ..	Subscription	66	
" "	Isleworth	Endowed National	Subscription	120	
" "	Dulwich	National	Rev. J. R. Oldham	84	
" "	Buckinghamshire ...	Mentmore	Lady de Rothschild... ..	28	
" "	Brixton-hill.	British	Committee..	57	
" "	Mile-end	St. Peter's Church	Subscription	30	
" "	Hill-street, Dorset-sq.	Cripples' Home	J. Marlan, Esq.	51	

RETURN OF SCHOOLS (*Continued*).

DATE.	FROM WHAT LOCALITY.	NAME OF SCHOOL.	BY WHOM SENT.	No. of Children from each School.	Total each day.
" "	Beddington, Surrey...	National	A. Smee, Esq.	98	1,012
" "	City of London...	4th National	Subscription	111	
" "	Walham-green ..	St. John's National...	Rev. W. Garratt.	230	
" "	Forest-gate, Essex ...	Industrial	Committee	63	
" "	Victoria-park	St. James's..	Individual Subscription ...	49	
" 16	Park-road, Lambeth...	British	Subscription	129	729
" "	Stepney	St. Peter's... ..	Subscription	32	
" "	Covent-garden ...	St. Peter's National...	Subscription	32	
" "	Walworth	South-street	Miss Bevington... ..	27	
" "	Brixton-hill	Wesleyan Day... ..	Committee	94	
" "	Edmonton... ..	Parochial	Subscription	137	
" "	Egham, Surrey ...	Coopers' Company ...	The Governors... ..	78	
" "	South London ...	Shoe-blacks	T. G. Payne, Esq.	15	
" "	Marylebone.. ...	St. Mary's	Subscription	69	
" "	{ Vincent - square, } Westminster...	St. Mary's	Subscription	37	
" "	Leicestershire ...	Kibworth	Rev. M. Osborn	30	
" "	Nutfield. Red-hill ...	Sunday	H. E. Gurney, Esq.	11	
" "	Clapton	London Orphan Asylum...	Committee	23	
" "	Holloway	Manor House	Dr. Dukes... ..	15	

VISITS OF WORKMEN.

The following is a continuation of the return of the number of workmen, mechanics, operatives, and others who have visited the building from the 13th to the 17th of October:—

DATE.	DESCRIPTION OF PERSONS.	FROM WHAT LOCALITY.	BY WHOM SENT.	NUMBER.
Oct. 13	20th Kent Rifle Band	Dartford	{ Messrs. J. B. White and } Brothers	16
" "	Employés at Cement Manufactory...	Dartford	{ Messrs. J. B. White and } Brothers	400
" "	Gas Work Operatives	Banbury, Oxon	The Directors.	11
" "	{ 7th Company, 2nd Battalion, } Coldstream Guards.	Wellington Barracks.. ...	Lieut.-Col. Sir E. Hamilton.	60
" "	{ Members of the Ragged School } Mothers' Meeting... ..	{ Kingsland, Dalston, & } Shacklewell	Mothers' Meeting Association	50
" "	Brewers and Maltsters	Amersham, Bucks	Mr. Wm. Weller	35
" "	Mechanics, Labourers, and Families.	Shirly, near Birmingham..	Rev. Nash Stephenson... ..	90
" 15	Shipwrights	Cardiff..	Messrs. Batchelers, brothers..	160
" "	Shipwrights	Cardiff..	Messrs. Chas. Hill and Son..	140
" "	Masons, Paviours, and Labourers ...	Holborn District.	Parish Authorities.. ...	32
" "	Parishioners.	Itchen Stoke, Hants ..	Subscription	40
" "	Labourers	Northington	Lord Ashburton	60
" "	Pianoforte Makers	Regent-street	Messrs. J. and J. Hopkinson.	210
" "	Labourers	Brown, Candover	Lord Ashburton	160
" "	Shipwrights	Bristol..	Messrs. Chas. Hill and Son..	38
" "	Agricultural Labourers	{ Badsey, Aldington, and } Wickhamford	{ Rev. T. H. Hunt, Rev. S. } Yorke, M.A., and John } Nind, Esq.	45
" "	11th Norfolk Volunteer Rifle Band..	Holkham	Capt. Holloway	12
" "	Labourers and Wives	Itchen Abbas	Rev. W. Spicer	33
" "	Mechanics and Farm Labourers ...	Northwick, Worcester ...	Lord Northwick	62
" "	19th Middlesex Volunteers	Battersea	G. F. Wilson, Esq., F.R.S... ..	19
" "	Brewers and Maltsters	Amersham, Bucks	William Weller	25
" "	Workmen	Fountain Works, Mitcham	M. W. Yates, Esq.	44
" 16	Rocking-horse Makers	Oakley-street, Westminster	Messrs. Palsen and Mansfield.	25
" "	Estate Labourers	{ Moor-park, Rickmans- } worth	Lord Ebury	58
" "	{ Members of the Working Men's } Institute	North Audley-street.. ...	Subscription	24
" 17	Timber Merchants' Employés.. ...	{ Nessington, Northamp- } tonshire... ..	R. Reedman, Esq.	21

INTERNATIONAL EXHIBITION OF 1862.

The following regulations for the removal of British articles not liable to Customs' duties have been issued :—

1. The Exhibition will close on Saturday, the 1st November. Sculpture and light goods which can be carried by hand may be removed on Monday, the 3rd November. The general removal of the fine art and machinery sections will commence on Tuesday, the 4th November.
2. In order to give those exhibitors who may desire it an opportunity of disposing of their goods, and avoiding the expense of removal, the public will be admitted to portions of the industrial department of the building until the 15th November, during which time purchasers will be allowed to take away such articles as can be removed by hand.
3. No packing cases, except for the picture galleries or western annex, will be admitted into the building until after the 15th November; but articles not requiring packing cases may be removed, at the option of the exhibitor, on and after the 3rd November.
4. A permit to remove articles will be issued to every exhibitor. This will admit himself or his agent and the requisite number of workmen, for which he must make arrangements with the district superintendent. It will be absolutely necessary that the exhibitor or his agent attend in person to admit his workmen.
5. Every exhibitor, or his authorized agent, in taking out articles, must fill up a receipt, and deliver the same to the officer on duty at the exit door. Forms of receipt will be given by the district superintendent.
6. The whole work of re-packing and removing must be done by the exhibitor or his agent, who should, therefore, provide sufficient force to ensure the safe and speedy removal of his goods.
7. In order to facilitate the removal of exhibitors' goods, her Majesty's Commissioners have granted permission to the principal London railway companies to have receiving offices within the building.
8. All empty packing cases must be brought in at the door appointed specially for their reception, and should be marked with the exhibitor's name, and the class to which they belong. Packing cases left empty or unmarked for more than 48 hours will be liable to be taken out of the building.
9. Exhibitors are requested not to allow the materials for packing to remain spread about on the floors after they have ceased working for the day. Materials so left will be considered as waste, and be swept out of the building every morning.
10. Her Majesty's Commissioners think it right to remind exhibitors that all responsibility for losses, breakage, or damage of any kind, rests entirely with the exhibitors themselves. Every care will be taken to prevent errors and losses, but it must be clearly understood that no responsibility rests with her Majesty's Commissioners.
11. Any further information required may be obtained on application to Mr. R. A. Thompson, assistant manager, English side.

By order of her Majesty's Commissioners,
F. R. SANDFORD, General Manager.

1st October, 1862.

The regulations for the removal of goods on the foreign side are as follows :

1. The picture galleries and the machinery building (western annex) will not be opened after the 1st November.
2. Sculpture and light goods which can be removed by hand will be permitted to be carried out on Monday, the 3rd November.
3. Empty cases will be admitted on Tuesday, the 4th November; for the picture galleries, by central entrance,

Cromwell-road; for foreign machinery, by the northern entrance of the western annex.

4. In order to give those exhibitors who may desire it an opportunity of disposing of their goods, thereby avoiding the expense of removal, the public will be admitted to portions of the industrial department of the building until the 15th November, during which time purchasers will be allowed to take away such articles as can be removed by hand.

5. After the 15th November all the empty packing cases may be brought into the main building.

6. The following will be the exit doors for foreign goods :—

Western Door, Central Entrance, Cromwell-road—Italy, Rome, Spain, Portugal, Russia, Turkey, Brazil, Greece, Central and South American States.
Opening in Cromwell-road—France.
South-west Tower—Zollverein and Hanse Towns.
North Door, Western Dome—Belgium, Holland, Switzerland, Denmark, Sweden, and Norway.
North-west Tower—Austria.
South Eastern Tower—United States.

7. The above are to be considered as foreign goods.

8. Pass books will be delivered to each foreign Commissioner, who will be requested to give the signatures of two persons authorised to pass out goods.

9. Coloured passes only will be available at the foreign doors, duly signed by the authorised persons.

10. Goods can be taken out by hand at any door on the foreign side; but cases must be taken out by the doors indicated above as appropriated to each nation.

11. Her Majesty's Commissioners will afford limited assistance for the removal and loading of foreign goods remaining unsold, and packed to be returned to their respective countries.

12. This assistance will be given from the 15th November to the 23rd December, after which date the men will be discharged, and all the cranes, platforms, and appliances will be removed.

13. All personal or written demands for assistance to be made to Mr. Philip Cunliffe Owen, assistant manager, foreign side.

14. Her Majesty's Commissioners think it right to remind foreign commissioners that all responsibility for losses, breakage, or damage of any kind, whether in the building or during removal, rests entirely with the foreign commissioners themselves. Every care will be taken to prevent errors and losses, but it must be clearly understood that no responsibility rests with her Majesty's Commissioners.

15. In order to facilitate the removal of exhibitors' goods, her Majesty's Commissioners have granted permission to the principal London railway companies to have receiving offices within the building.

By Order of her Majesty's Commissioners,
F. R. SANDFORD, General Manager.

The Customs' Regulations for the Guidance of the Foreign Exhibitors at the Closing of the International Exhibition, 1862, are the following :—

1. All foreign articles liable to duty intended for sale by retail during the first fourteen days of November, must be previously cleared of the Customs, either by the actual payment of duty or deposit of money sufficient to cover all duties due.

2. In order to facilitate the speedy removal of goods, it will be necessary for the foreign exhibitors to furnish the officers of the Crown with a written statement (the form of which can be obtained at the Customs' office, No. 19, Western Dome) showing the nature and quantity of the goods, and whether they are intended for "payment of duty," or for exportation. This must be done on or before the 25th instant, on which day the amount of "duty

payable," or of the "deposit," must be determined and assessed.

3. No articles liable to duty shall be packed up either for "payment of duty" or for exportation, without the knowledge and consent of the officers of the Crown stationed in the building. If so done they will be unpacked in order that the necessary official return may be obtained.

4. In the case of dutiable goods for exportation, an entry shall be passed in the long room of the Custom-house, and land given for their due exportation, and on the receipt of this entry by the officer in charge of the Exhibition building, the goods shall be packed in his presence, and if for shipment at an outpost, placed under seal, and forwarded in charge to a railway or other public company; but if for shipment at the port of London, they shall then be sent in charge of Customs' officers at the expense of the exporter, to be delivered into the charge of the searcher of the station from which they are to be shipped, without further examination, under the regulations applicable to goods shipped direct from the warehouse.

5. The list of the principal articles subject to the customs duties is annexed:—

LIST OF PRINCIPAL ARTICLES SUBJECT TO CUSTOMS DUTIES.		s.	d.
Biscuits, bread, &c., per cwt.....	0	4½	
Confectionery, chocolate, per lb.	0	2	
Coffee, raw, per lb.....	0	3	
Coffee, roasted or ground, per lb.	0	4	
Chicory, raw, per cwt.....	6	0	
Chicory, roasted or ground, per lb.	0	4	
Cocoa paste, per lb.	0	2	
Chloroform, per lb.....	3	0	
Cereals, grain of all sorts, per quarter of 8 bushels	1	0	
Flour, meal, rice, vermicelli, &c., per cwt.....	0	4½	
Pepper of all sorts, per lb., and 5 per cent. thereon	0	6	
Plate of gold, per ounce, troy	17	0	
Plate of silver, per ounce, troy	1	6	
Raisins, currants, plums, and figs, dried, per cwt..	7	0	
Sugar, refined or candy, per cwt.....	18	4	
Sugar and molasses, according to quality, per cwt., from 16s. to.....	5	0	
Spirits, viz :			
Brandy, gin, and rum, per gallon	10	5	
Perfumed spirits, eau de Cologne, and liqueurs of all sorts, per gallon	14	0	
Tea, per lb.....	1	5	
Tobacco, viz :			
Cigars and manufactured tobacco, per lb., and 5 per cent. thereon	9	0	
Snuff, per lb., and 5 per cent.	6	0	
Unmanufactured leaf tobacco, per lb., and 5 per cent.....	3	0	
Varnish, containing spirit, per gallon	12	0	
Wines, in bottle, per gallon	2	6	

PRODUCTS OF INDIA.

The following notes are extracted from the official Catalogue of the contributions from India to the International Exhibition of 1862.

COTTON.

Only two specimens of this important article are submitted from Cuttack, as it must be admitted that, generally speaking, the cotton grown in this district and Pooree is wretchedly inferior, both in the length of its staple and in respect of cleanliness. The first sample of the raw material and the thread were presented to the committee of Cuttack by the Rev. George Taylor, of Piplee, a missionary in connection with the General Baptist Missionary Society, who has for some time persevered in an experiment on a small scale to grow, and thus encouraged others to grow, this useful staple. His plants reared from American New Orleans seed yield, as calculated on his data, at the rate of 300 lbs. per English acre, at an out-

lay of about 21s. per acre. On a light sandy soil the plants require manure and irrigation only in the hot months, or from March to June. There are specimens of good cotton grown in Sumbulpore, from which district a deal of cotton is annually brought down the Mahanuddy. The cotton is shown as first freed from its seed, and then as operated on by the *Dhooena* or cotton carder. His machine is in the shape of a bow, with a string of cat-gut, and his mode of operating is as follows: The bow is held in the left hand, and its string laid lightly on the cotton spread out on the floor. Then, with a short club in the right, smart strokes are administered to the string, which is thus made to vibrate, and so to take up and draw out the fibres, at the same time it may easily be seen breaking them. A man can thus card 10 lbs. of cotton per diem, and charges, according to season, from 2d. to 4d. and 5d. per pound, as the degree of fineness required is more or less. This method of carding cotton would, however, appear to be very ruinous. Very little care is bestowed on the cultivation of cotton in this province. In the settled parts the crop is for the most part a stunted, weakly, annual one, frequently grown in the same beds with other crops, and therefore yielding a poor return. More cotton is raised in the Sumbulpore district comparatively than elsewhere in the district, and three-fourths of the produce is said to be exported to Cuttack and Calcutta. Last season the local rates at Sumbulpore were, for uncleaned cotton, ½d. per lb., and for cleaned cotton, 3d. These rates may not, however, be assumed as average ones. The specimen cotton brought from Sumbulpore was, in October, 1861, selling at Cuttack by retail at 1½d. per lb.

It is difficult, in the absence of statistics, to state what may be the area in this division under cotton cultivation. From the last land settlement papers of the Cuttack district, dated in 1843, we learn that 3,000 acres were then sown with cotton in that district. There are no similar statistics available for the other parts of the division, but proceeding by comparison on this basis, and keeping well within probabilities, it may be said that, taking the entire division as at present constituted, there must be 20,000 acres annually cultivated for cotton. This, at the moderate calculation of 175 lbs. per acre, would give 3½ million lbs. of cotton as the entire crop of the division. Inquiries made a few years ago in Sumbulpore showed that in that district the cotton crop was 10,000 maunds, or 1 million lbs. But it is impossible to believe that the local produce is not very much in excess of the above estimate, namely, 3½ million lbs. It may be allowed, for instance, that the exports of raw cotton from the division, taken as a whole, are balanced by imports on the north and south boundary, and this perhaps is allowing a great deal. It may also be allowed that possibly 25 per cent. of the local cotton fabric is woven from mule twist or foreign thread, called the "Kal-Soot," or machine thread, which is undoubtedly used extensively, but only in certain well-known centres. After these deductions have been made, there are still 75 per cent. of the wants of the people of this division in the matter of clothing material to be accounted for. Now it is undoubted that these local wants in the gross are supplied to an insignificant extent only by Manchester piece goods, or any foreign-made cloth whatsoever, and it follows, if it were not otherwise a patent fact, that the mass of the people of the division are clothed with material of local manufacture. Supposing then that the gross population of this division, including, with the settled districts of Cuttack, Pooree, and Balasore, the Tributary Mehals, and Sumbulpore, be estimated at 3½ million souls, and assuming that on a safe average every individual annually requires 4 lbs. of cotton to clothe himself withal, there would be required for the 3½ millions of people, 14 million lbs. of cotton; and admitting that 25 per cent. of the local demand is met by the use of foreign thread, there will still remain 10½ millions lbs. of cotton, which, to all appearances, must be supplied from local sources. This

is close upon three times more than what, on the known area of cotton cultivation in one small portion of the division, has been calculated to be the total area of the whole.

Cotton is cultivated all over Oudh as a mixed crop, in light soils, with "Arhar," *Cajanus Indica*, or with "Kodo" *Papalum Scorbicalatum*, and often with maize. It is sown in the month of June. It is sown broadcast with the above, and nothing is done to it till it begins to ripen in the pods. The cotton is picked out of the shell which is left on the tree, but no care is taken to keep the clean portion separate, and to keep the best pods for seed. The proportion of staple produced is very small, on account of the bad treatment it undergoes, being, as it were smothered by other fast growing plants. Almost all the wearing apparel of the ryots is made from native home-grown cotton. Its cost, with seed, is from 15 to 20 seers per rupee, and the fibre separated from the seed sells for 2 seers for the rupee. The seed is used for feeding cattle. No oil is extracted from it.

Cotton is principally grown by the hill tribes in Akyab, but little is brought down to Akyab or other markets. Price—from 6 to 7 rupees per maund.

The area under cotton cultivation in Pegu, in 1860-61, was 17,500 acres; estimated produce in cleaned cotton, 2,116,300 lbs. The general character of the native cotton is—fibre coarse, curly, harsh, and rather short, most tenaciously attached to the seed, but it is most exceedingly strong, and in this respect lies its excellence. Persevering efforts have been made to induce the Burmese to grow foreign cotton, but, as in the case of tobacco, without success. There are many millions of acres in Pegu now lying waste, where cotton can be grown of a quality far superior to any now known in the province, only awaiting European capital and superintendence. It is hoped that the recent offer by the Government of India of the fee-simple in waste lands, free of tax for ever, at the low rates of 5s. and 10s. an acre, will attract both speedily, to the mutual benefit of England and Pegu.

Specimens grown from American seed at Lahore are shown. The average for cleaned cotton is 3d. per lb., and for uncleaned 1d. per lb.

Cotton is grown largely in the Punjab, chiefly for home consumption, but the soil is generally not so suited for it as the basaltic soils of Central India. Still there is no doubt, from experiments which have been made, that the Punjab is capable of producing cotton suitable for the English market. But efforts to secure it must not be confined to making speeches at Manchester; the only practical plan is to depute persons of skill and capital to direct the people in the best mode of preparing the cotton, and to buy up the produce on the spot. Specimens of cotton from the principal cotton-growing districts of the Punjab have been included in the collection, and also a specimen of cotton grown from American seed in the Dehra Ismael Khan district. The localities best suited for the growth of cotton are the submontane districts of Umballah, Hoshiarpore, Gujerat, and Peshawur, but with irrigation it might be produced almost anywhere. From official returns published in the *Punjab Gazette* of the 28th August, 1861, it would appear that altogether about 467,513 acres are under cotton cultivation in the Punjab and its dependencies. The average produce per acre of cleaned cotton varies from 50 to 150 lbs.; its price varies from 2d. to 4½d. per lb.; and the whole cotton produced per annum amounted to 20,000 tons, of which not more than 3,500 tons were exported. The time of sowing varies from February in the south, to the middle of June in some of the northern districts. The flowering commences, according to locality, between August and December; the picking follows about a month after the flowering, and continues at intervals for two months.

Cotton is one of the chief products of the Banda district. Inquiries have lately been made for the purpose of ascertaining the present extent of cotton cultivation, From these inquiries it appears that in the present year

the total number of acres in the district cultivated with cotton is 89,022. The area of the district in acres is 1,920,302. At this rate, therefore, about 4½ per cent. of the whole area of the district is cultivated with cotton. The extent of cultivated land in the district is 955,522 acres. Cotton cultivation occupies rather more than 9 per cent. of the whole cultivated land. This per-centage varies in different parts of the district. The Eastern Pergunnahs produce both absolutely more cotton than the Western Pergunnahs, and more relatively to their size. In Tirohan cotton occupies nearly 22 per cent. of all the cultivated land of the Pergunnah. The best cotton comes from the Beergurh and allinger portions of the Budonsa Pergunnah.

Cotton is a precarious crop. Its success or failure depends entirely upon the rain-fall. It is injured by drought, but its chief risk is from excess of rain. Last year considerable damage was done to the cotton crops by the severity of the wet season, and especially by the heavy fall of September. Cotton being entirely a "Khureef" or rain crop in this district (Banda) it cannot be sown in the low rich lands which bear the best spring crops, and which are generally flooded in the wet season. It is sown generally on high ground, on higher soil, in the sides of ravines for instance, or on elevated spots where the water cannot lodge. In its best season it is more remunerative than ordinary crops, but it is uncertain and precarious, and in the long run it is not sufficiently remunerative to induce ryots to cultivate more than a small portion of their land with it. If a man has 10 or 15 beegahs of land, he will almost certainly cultivate two or three with cotton, but he will not cultivate more. If the price were to rise the cultivation would no doubt be extended; and if it rose enough to make the cultivation of cotton considerably more profitable than that of other crops, it might be extended almost indefinitely.

In this district the same land is never cultivated with cotton in two consecutive years. After a field has borne cotton, always two years and sometimes three are allowed to intervene before it is again sown with that crop. Entirely new lands are said to be more fruitful than any; fresh cotton is always sown. The same plants are never allowed to remain standing for a second crop. It is the common opinion of the people of the district that the plants produce nothing in the second year. The sowing takes place in the month of Asar, or July, commonly after the first fall of rain. The ground is generally manured, if the ryot can afford it. It is ploughed only once. It is never watered, but it is always weeded while the crop is springing up. It is weeded, as a general rule, three times, but in some cases it is weeded four times, and occasionally, but very rarely, as many as five or six times. The weeding takes place during "Sawun" or August, "Bhadow" or September, and the beginning of "Roar" or October. About the end of October the crop is generally matured, and the gathering takes place between this and the end of December.

It is not easy to estimate the produce per acre. The produce varies considerably in amount in different parts of the district, and the want of a fixed standard of weight throws increased difficulties in the way of forming any satisfactory estimate. In no two pergunnahs is the "seer" exactly equivalent, and in many cases the variation in the standard is very large. Another difficulty arises from the fact, that in this district cotton is scarcely ever sown singly. Urhur, Oorid, and Teelee (an oil plant) are almost invariably sown with it in small quantities. No doubt, if cotton were cultivated alone, the average produce would be higher than it is. As it is, taking the seer of the full weight, probably the average produce per acre in ordinary years does not exceed 80 seers of "kupas," kupas being the raw uncleaned cotton with the seed. The price of kupas in the villages varies from 9 to 14 seers for the rupee. But this difference is due probably more to the variation in the standard of weight than to any other cause. Probably from 10 to 11 full weight seers

for the rupee may be taken as the average price of kupas over the whole district. This would give nearly 8 rupees as the average value of the produce of an acre, and rather more than 3 rupees as the value of the produce of a beegah. This estimate must be near the mark, because from 3 to 4 rupees is the sum at which the people of the district themselves almost invariably estimate the value of the produce of a beegah of cotton. And something must be allowed for the produce of the urhur, teele, &c., sown with the cotton. The estimate cannot be too high, because if it were, cotton would be less remunerative than other crops, which it certainly is not. The kupas or raw cotton is prepared for the market by the extraction of the seeds. This is done with the instrument called the "*Churkhee*," consisting of two small rollers, one of iron and one of wood, which are made to revolve in opposite directions, and in close proximity one above the other, their axes remaining parallel. The raw cotton is introduced between these rollers, and as they revolve the pure cotton is carried through while the seed is separated and left behind. The instrument in use in this district is worked by two persons, each turning a roller, and is the same as that to be found all over India. The raw cotton loses from two-thirds to three-fourths of its weight under the *churkhee*. That is to say, of the better kinds of cotton one seer will be obtained from three seers of "kupas," the remaining two seers being "benowur" or seed. In the inferior qualities, it requires four seers of kupas to produce one of cotton. It follows, then, that if the average produce of an acre sown with cotton be assumed to be 80 seers of kupas, the average produce per acre of "rooe" or clean cotton will be between one-third and one-fourth of that quantity. Probably 25 seers per acre will be a fair estimate. But this estimate, it should be remembered, is for ordinary years. The last must be considered an exceptional year, the cotton crop in some parts of the district having almost entirely failed in consequence of the heavy rain fall in September, and being generally more or less damaged. The actual average produce per acre for the year will probably be considerably below the above estimate.

As a general rule, the kupas is cleaned of seed and prepared for the market by the ryots themselves. But not unfrequently traders, "*baipareas*," buy up the raw material in large quantities, and pay for its cleaning by hired workmen. In this case the workmen are paid in proportion to the amount of clean cotton produced. The rate varies from year to year, and differs in different parts of the district. For producing a maund of clean cotton the rate is sometimes as low as 6 or 8 annas, and sometimes as high as one rupee. Eight annas may perhaps be taken as an ordinary rate. The cotton seed or benowur obtained by passing the "kupas" through the *churkhee* may be valued at about one rupee per maund. The data for calculating the cost price of a maund of clean cotton of the best quality are as follows:—

Cost of 120 seers of kupas, at 10 seers per rupee	12	0	0
Cost of cleaning by <i>churkhee</i>	0	8	0
Total rupees	12	8	0
Deduct price of maunds of "benowur" (seed), at 1 rupee per maund	2	0	0
Rupees	10	8	0

Rupees 10-8 may thus be regarded as the cost price of a maund of clean cotton. Allowing for the trader's profits and for cost of carriage, we have from rupees 12 8 to 13 rupees as a fair market price under ordinary circumstances. This happens to be exactly the price of cotton at the present moment in the market of the district. The price may be expected to rise. The price always does rise towards December and January (it rose last year to 16

rupees per maund), and this year (1861) the shortness of the crop will, no doubt, make itself felt, while the Manchester demand will also probably not be without its effect. Taking the average produce per acre of cleaned cotton at 25 seers, and 13 rupees as the price per maund, the following estimate of the out-turn of the district in maunds, and its value is obtained:—

Area Cultivated with Cotton. Acres.	Estimated out-turn in Maunds.	Estimated value Rupees.
89,022	55,639	7,23,307

This represents the out-turn and its value in ordinary years. Probably in the present year (1861) the out-turn will not be much above 50,000 maunds. At 13 rupees per maund, the value of this quantity would be 650,000 rupees. But the price will probably rise so as to make the value considerably higher than this.

Of this total out-turn probably about seven-eighths is exported, and the rest remains in the district, and is used for the manufacture of cloth and other purposes. That which thus remains passes through the hands of the "*behnas*," who card it and twist it into thread with the instrument known as the *dhunooce*, and prepare it for the weaver. Almost all the cotton which is exported passes either through Chilla, on the banks of the Jumna, in Purgunnah Pylancee, or through Rajapore on the Jumna, in Purgunnah Cheebow, and far the larger portion through the latter place. At these places the cotton is shipped in river boats, and carried thence to Mirzapore, Ghazeepore, Calcutta, or elsewhere. The average cost of transport is 1 rupee per cart to Chilla, and 4 rupees per cart to Rajapore. A cart carries from 9 to 12 maunds. The water carriage by boat from Chilli to Mirzapore is 3½ annas per maund, and from Rajapore to Mirzapore from 2 to 2½ annas per maund. The present price of cotton in Rajapore is 12 rupees a maund.

The following statement shows the extent of cotton cultivation in different pergunnahs in Zilla Banda:—

NAME OF PERGUNNAH.	Total area in Acres.	Total Cultivated Area in acres.	Cotton Cultivation in Acres.	Per cent of cotton cultivated in the whole area.	Per Centage of cotton cultivated area.
Banda	2,42,983	1,44,303	8,759	3.6	6.07
Pylancee	2,47,884	1,46,083	9,730	3.9	6.6
Ongasee	2,32,840	1,35,468	8,298	3.5	6.1
Seonda	1,83,483	1,08,712	5,684	3.1	5.2
Dursenda	2,30,832	1,24,260	14,779	6.4	12 nearly.
Chiboo	2,02,318	97,011	9,947	4.9	10.2
Tirohan	3,41,027	78,878	17,297		22 nearly.
Badousa	2,38,936	1,20,837	14,528		12.0
Total	19,20,312	9,55,552	89,022	4.6	9.3

BRITISH ASSOCIATION, CAMBRIDGE, 1862.

PREVENTION OF RAILWAY ACCIDENTS.

The following paper, by Mr. J. Sewell, Assoc. Inst. C.E., was read in section G:—

This is a subject of great importance, both to the travelling community and the railway interest, yet, in my opinion, it is one that admits of a solution with benefit to both parties.

Through your goodness, some years ago I was enabled to bring under the notice of the Association a paper upon the causes of boiler explosions, fracture of axles, the advantages of thick edge boiler-plates, &c., which I believe has been useful, and I trust that my present suggestion, of a simple yet effective plan to obviate most of the railway accidents that occur, will likewise prove of utility.

The primary cause of most of the serious railway accidents is, that railway companies are not liable either for over-loading their engines or for not keeping time at all the stations. It only requires, in my opinion, to attach suitable penalties for both over-loading engines and for not keeping time, to ensure greater safety to the public, and better dividends to the shareholders. On many lines trains are more numerous than there is any need for, since every district has a regular traffic; beyond which, it requires stimulants to temporarily increase it, which stimulants, judiciously employed, do good, but, when used in excess, are both costly and dangerous, as train after train follow each other, some stopping at one station, and some at another station, and some, as express trains, at very few stations, where one train would suffice. A few accidents arise from gross neglect of signal duty, defects of the road, and breaking down of plant, which are more or less strictly accidental, for the best mechanism may, and does fail. The human being likewise may, and does fail unexpectedly at times, especially during long sustained watchfulness, whether on railways or other duty. On railways both men and mechanism frequently fail through overwork, or through surprise, caused by irregularity of the trains, as, for instance, the Brighton Tunnel and Kentish-town catastrophes, as well as many others.

Railway companies issue time bills for the guidance of their servants and of the public, but plead non-liability to keep such time. The plea is passively allowed, for there is no one to enforce time being kept; so that few trains keep time exactly at all the stations they pass, yet no effective notice is taken of this breach of contract unless through an accident. Now, as the loss of time is mainly due to irregularity in starting trains, and to over-loaded locomotives being unable to keep the specified time, it is evident that punctuality in starting trains, proper loads, and well kept time at all stations would effect a most advantageous improvement upon the present state of these matters.

It is commonly supposed that the steam horse possesses such unlimited power that a carriage or two more or less makes little or no difference to running the given distance in the given time, but this is a popular error which lies at the root of all the mischief.

The power of the steam horse is proportionably as easily overlooked, as is that of the coach or race horse, with this difference against the steam-horse—namely, that he has to contend against all the contingencies of slippery rails, inclines, retarding winds, delays at stations (often due to travellers themselves), yet is popularly expected to run the distance in the given time, whether heavily or lightly loaded, whether stormy, slippery, or calm.

Now when the race-horse runs against time, the weight is fixed for distance, time, and other circumstances. No one would dream of over-weighting a race-horse, and then running him against the time for the lightest racing weight, yet this is the practice of railways, whereby irregularity is the result. Nature limits the power of the race-horse, and, in order to save fuel, mechanism is used to limit the power of the steam-horse, hence delays take place and risks are incurred in order to save a little fuel. This mechanism, as is well known, cuts off the steam from the cylinder some time before the power has reached the end of the stroke, varying from one-fourth to three-fourths of the length of the cylinder, so that the *real* and the *nominal* power may, and do differ widely. If, therefore, an engine, having its power thus limited to take eight or ten carriages in the given time, has to take ten or twelve carriages, it follows that such over-loading will cause loss of time.

But, as travellers do not know the power of a locomotive by looking at it, nor clearly understand the dangers they run on a crowded line by its being over-loaded, it becomes, I think, the duty of the Government to step in and ask for power to licence each locomotive for a certain duty, and to enforce regularity of time at all stations, as essential to public safety.

It has been found necessary to licence steam-boats and common road vehicles to carry a given number of passengers only, and, in like-manner, it has now become requisite, for public safety, to licence each locomotive to draw a definite number of vehicles, whether for passengers or for merchandise, and to place that licence conspicuously on each engine. Passengers generally take care that carriages are not over-crowded, and would equally take care that locomotives were not over-loaded if they only knew the right load by referring to a licence plate on each engine. If it is necessary, for pecuniary reasons alone, that arrangements between two companies, or between the Post-office, and companies should limit the loads as they do, it is undoubtedly necessary, on the ground of safety between the railways and the public, to limit the loads to the real power of the engines.

The Board of Trade could easily carry out the required duty by means of qualified inspectors, with power to periodically alter, renew, or withdraw licences, as the working state of each steam-horse might warrant from time to time.

As such a step would probably require either an increase of locomotive power or a decrease of speed to work the same traffic, it would prove to that extent that the present engine-power was deficient for safe working. It is the over-loading of engines and uncertainty of time that renders excursion trains more dangerous than others, but that is no valid reason why excursion trains should be discontinued. In fact, there is no more need to deprive excursionists of their healthy cheering trips, which contribute to recruit both their mental and bodily vigour and railway exchequers, than there is to deprive society of food or wine, because both are occasionally abused.

Since excursion trains are a mine of wealth to a railway company, and a mine of health to the community, instead, therefore, of prohibiting them, as is too often suggested, they should be extended, as they may be without any such risks to them or to other trains as they have hitherto had to encounter. Substitute well kept time, for the present ill kept time—licensed engines for unlicensed ones, and trains may be run more frequently, and more safely than at present.

Under the present non-liability system, it speaks highly for the general vigilance of railway officials that so few accidents occur, and such an alteration as the one now proposed would be a great relief to them. The traffic on several railways now resembles that on an overcrowded street, where great difference in speeds cannot be allowed with safety; and as in crowded streets the extreme speed of the horse is dangerous, and at a moderate speed an enormous traffic can be carried on safely (along London-bridge, for instance, where there is five times the traffic of any railway), so in like manner on railways extreme speeds should be reduced to moderate ones; regularity be substituted for irregularity, whereby both safety and economy will result.

It is an axiom, I may say, that extreme speeds entail extreme costs, besides risks, for on railways as on roads or streets, costs increase in a greater ratio than velocities, so that high speeds and higher costs are synonymous and convertible terms. Limited loads and kept time duly enforced, appear to me to be simple remedies for the existing dangers, which would alike contribute to the public safety and increased profits to railways.

OBLATE PROJECTILES WITH CYCLOIDAL ROTATION, CONTRASTED WITH CYLINDRO-OVOID PROJECTILES, HAVING HELICAL OR RIFLE ROTATION.

The following paper, by R.W. Woolcombe, was read in Sect. G:—

Although a paper entitled "An Account of some Experiments with Eccentric Oblate Bodies and Discs as Projectiles," was produced by me in March last, before the Royal Society, and was printed in their proceedings for May, yet the results of some further experiments with a

model at Shoeburyness, as to penetration and velocity, appear to me of sufficient interest in a practical point of view to be brought to the notice of the British Association.

It appears that in gunnery the requirement of the day is some arrangement by which, in one shape or other, heavy solid shot can be projected with high initial velocity, yet such velocity be maintained better than it can be in spheres.

While ships were of wood there was a requirement for powerful and capacious shells, and such projectiles were forthcoming by the rifle principle, but (abiding the results of the progressing trials with Mr. Whitworth's punch-headed shells), the iron plates may be said to have brought solid shot into the foreground. Rifled cannon, it appears, cannot project heavy elongated shot with high velocity, and it is seen (again excepting Mr. Whitworth's results with flat-headed projectiles), that, for the penetration of iron plates a high velocity is essential, at least within the more manageable weights, say up to 120 lbs. It seems that for heavy shot we have of late reverted to spheres, and thus, after an acquaintanceship of not many years' duration, have so far taken our leave of science for the solid projectile, retaining her aid only for the building up of Cyclopean smooth-bore cylinders. A return to the smooth-bore cylinder would not necessarily be a retrogression, it might be an advance in science could we successfully project from the smooth-bore shot that are elongated; it is in the abandonment of elongation for the projectile that science has retrogressed. If, then (with the exception still under trial), we find that from neither rifled nor smooth-bored cylinders we can advantageously project, in respect of iron plates, heavy elongated shot, are we compelled by the requirements of the hour, therefore, to forego for the larger calibres the many advantages we have learned from the smaller calibres to appreciate in elongation? The question presents itself: "What is there in the rifle principle and in elongation by the cylindro-ogival form that appears to bar development—that prevents a natural expansion from small to great calibres—that in* practice makes the 80-pounder give scarcely more range than the 3-pounder, and but just now, when called upon for great action, has made this principle give place to the primitive sphere and smooth-bored cylinder? Mr. Whitworth's 3-pounder at 5° elevation gave 2,500 yards; his 80-pounder at 5° gave 2,544, each with a charge of about $\frac{1}{4}$ th the weight of projectile. The reason may, I believe, be found in the artificial basis of the rifle principle. However well-suited the helical or rifle method, with cylindrical elongation for the projectile, may be for small arms, and for, perhaps, the lesser calibres of cannon, yet when we desire to so far imitate nature as to project with great and sustained velocities, great weights, we might succeed better were our mechanical arrangements less antagonistic than are those of the rifle principle to certain great laws of nature, to the laws which have ruled in the form, method of rotation, and translation of what I may here term the great natural projectiles—the planets. Do we find any one of these to be a prolate body projected with helical rotation about its longest diameter and in the direction of such axis? In the two first conditions, namely, the prolate form and helical rotation, we have, I think, the clue to the small initial velocity afforded by, and inexpansive nature of, the rifle principle; and in the third condition, or the axis of rotation lying in the plane of projection, is the reason why the rifle principle has not done, and never can do, anything to improve vertical fire, or to be in any calibre effective dynamically except at very low elevations, a matter of no consequence in small arms. These defects are inherent to the rifle principle. Is there any other arrangement practicable in which, by a construction less in violation of the natural laws alluded to, the defects spoken of in respect of rifled cannon may not exist? In reply, I have to say that I have found it to be practi-

cable to project a body that is, instead of being prolate, more or less oblate; that, instead of having helical rotation at the expense of translation, has cycloidal rotation in aid of translation; a projectile that rotates about its shortest diameter, or the natural axis of rotation of a body naturally formed for rotation, instead of about the longest diameter or unnatural axis of a body not formed for rotation; that while the projectile has a circular periphery in the line of motion in the gun, and can thus leave the bore as freely as a common round shot, yet it has the additional security for high initial velocity of windage much* smaller than could be allowed for round shot of similar weight; that is, like the round shot, driven through the gun along a straight smooth bore, but as a wheel, instead of being forced into and through a helix as a screw, and thus conditions for a vast superiority in initial velocity are given to it over the rifle projectile, and from the diminished windage much superiority in initial velocity over the sphere. The terminal velocity is also provided for by the oblateness, and for any elevation† by the axis of rotation being transverse to, and not in the plane of the trajectory.

The gun is of similar transverse section to that of the projectile, the bore, as has been said, being straight and smooth, with the longer axis of the bore in a direction perpendicular to the common axis of the trunnions. The gun is to be fired with the trunnions as horizontal as possible, as indeed all guns are. The projectile is a disc, scarcely more costly in manufacture than a common round shot, and which is fit for use almost in the state in which it is taken from the mould. It must be slightly eccentric or it will not rotate. I find that not more than $\frac{1}{50}$ of the concentric weight need be added or subtracted to secure rotation; less than $\frac{1}{50}$ has given rotation in a disc. All spherical shells used by the American Federal states are purposely made eccentric by about a similar amount. All spherical shells are *inevitably* eccentric, so are ninety-nine out of a hundred spherical shot. I merely propose to apply to an advantageous purpose an eccentricity scarcely greater than is *inevitable* in any spherical projectile, and by such means to secure and multiply the advantages of virtual elongation by the cycloidal rotation of an oblate body instead of the helical rotation of a projectile elongated cylindrically, by which is to be, I believe, secured an initial velocity greater than that of a sphere in a ratio increasing with dimensions, and the conditions are afforded for maintaining such velocity at any elevation better than can be secured by the use of the rifle principle.

I will mention, as briefly as possible, the results of experiments shown to the Ordnance Select Committee in March last, with a small rough model. The gun was only 20 $\frac{1}{2}$ inches long in the bore, or 10 $\frac{3}{4}$ calibres in length, the calibre (long diameter), being about 1 $\frac{1}{8}$ inch, and the transverse or short diameter about $\frac{3}{4}$ inch. The shot weighed between 7 $\frac{1}{2}$ and 8 ounces. The experimental gun being externally a mere cylindrical block, weighed more than would have been otherwise necessary, and from

* For a round shot must be allowed a larger margin of windage for defects in sphericity than is necessary for a disc; the latter need only slide freely laterally, and can roll but on one axis, the round shot must have windage enough to roll on an infinity of axes. A remarkable instance of the effect of windage on velocity is seen by the results of some recent experiments by the Ordnance Select Committee with Navé Electro Ballistic Apparatus. Of all the kinds of solid shot guns (smooth bored), from the 68-pounder of 95 cwt., to the 6-pounder, the highest initial velocity, with the full service charge, was given by the 12-pounder (smooth bore); doubtless from the fact of that being the largest of those smaller calibres to which the windage of only 0.1 inch has been allotted—so that the windage of the 12-pounder is comparatively the least of any of the smooth-bore guns. All the guns, except the 68-pounder, were fired with a charge of one-third the weight of the shot; the 68-pounder with the usual charge of 16 lbs., or about one-fourth.

† As the requirement of the tangent to the path does not obtain in discs.

* Vide *Times* of February 20th, 1860, for report of the Southport experiments.

having also been of necessity built up and not bored, its weight was about 130lbs. With a charge of 2½oz. the penetration at 25 yards from an oak target was a mean of 11 inches reckoning to the near side of the disc, and to the far side nearly 13 inches. The initial velocity which gave this penetration was, as measured by Navé's Electro Ballistic Apparatus, 1487 feet per second. Desirous of comparing a spherical shot with mine, the Ordnance Select Committee fired a few shots with a small brass gun, the length of bore of which was 34·625 inches, and nearly double the length of mine in calibres. The mean calibre of the Committee's gun was 1·60 inch, but at the muzzle something more. The mean diameter of their shot was 1·43 inch. Fired with proportionate charges the penetration of the disc gun was more than double that of the Committee's gun in the oak, and its initial velocity as 1487 to that of the Committee, 1091. The mean penetration of the Committee's gun was 5 inches, that of mine 11 inches. In these trials at the oak, all the discs fired with the centre of gravity "above" in the bore struck upright as fired.

At a subsequent trial for velocity some discs were fired which were laterally as well as longitudinally eccentric, and though they evidenced by the holes in the target confirmed rotation on the desired axis, yet this rotation was not in one plane. At close quarters this would be immaterial, as the penetration is not affected, and I believe it to be very practicable to make discs sufficiently symmetrical and homogeneous laterally.

Excepting when the trajectory was square or perpendicular to the plane of the target, a condition that must be I presume very rare in actual service, a disc would have almost the advantage that a flat-headed cylindrical projectile has in respect of contact over one with a hemispherical or ogival head, while for the reasons I have already named the disc is likely to have a much greater velocity than any rifle projectile, in which case more effect is probable against iron plates.

I will conclude by mentioning that even with this short model of 20 inches long, or 10½ calibres, the velocity has approximated to that from the 68-pounder of 95 cwt, viz.:—1494·4 feet per second, as compared with 1553·3 feet per second, the former at 60 feet from muzzle, the latter at 90 feet, the former with ⅓ of discs weight, or 2·625 ounces, the latter with 16lbs. charge or about ⅓ shot weight.

I think then, that having in view the great requirement of the day, in respect of projectiles, viz.:—the conditions for effecting the penetration of iron plates—it may, considering the above results, already appear worthy of regret that the subject has been permitted by the military authorities to fall to the ground without any further trial.

ON THE SUBJECT MATTERS AND METHODS OF COMPETITIVE EXAMINATIONS FOR THE PUBLIC SERVICE.

The following paper was read in section F, by the President, Mr. Edwin Chadwick, C.B.:—

I may assume that the principle of competitive examinations on an open and a fair field, without favour, for junior appointments to the public service, which has been discussed at two meetings of this section—first at Dublin and next at Leeds—which has been several times affirmed in parliament, will be maintained and advanced on further trial. Nevertheless there is much in the subject matter of the examinations, and in the methods of conducting them, which in the view of many who have paid attention to the subject require amendment for the sake of the principle itself. I am desirous, therefore, of raising a discussion in relation to those subject matters and methods, to obtain the results of as much as possible of the experience of members of the university who have been engaged in the important service of testing qualifications by means of open competitive examination. In respect to the subject matters of examination for the most important commissions, I conceive that the civil service commissioners and the members of the council of military

education could not, at the outset of the system, well do otherwise than adopt, as their subject matters of examination, the generally accepted course of a liberal education as nearly as was practicable. But it is one important effect of the principle of open competition, and of the practical arrangements in connection with it, that it must bring scholastic systems and principles of education and subject matters more closely than heretofore into harmony with the practical requirements of the country.

I may go further and say that, instead of adopting any of the accustomed academic courses, the experience of the public requirements of the service must fashion those courses to the service required. It may, however, be submitted to be for the advantage of academic institutions that it should do so. The requirements for the leading competitions—those for the scientific corps of the army and the Indian civil service have led to the extension and formation of large preparatory schools, for giving training for those public examinations, which, for myself, I should have preferred to have given by our own chief public schools. The head of one large public school advised a friend who had a son to prepare for a competitive examination, to take him to one of the special preparatory schools in preference, as being superior in efficiency for the special purpose. I believe that those schools are of considerable and increasing comparative efficiency, for this reason, that they are themselves, by the competitive principle, put under the most direct and powerful competition with each other. Not only do the schools compete, but each master of each head of competition with the teachers of that same head of competition in all the other preparatory schools. I have made inquiries of the head masters of several of these successful training schools, and I may express a confident opinion that they would all agree in the importance of ridding the competitions to the uttermost of everything necessitating or favouring cram. They would next agree that the present topics of competition are too numerous. It is true that the competitor may take up a lesser number of heads than are put forth, but practically to permit, say five heads of competition, at the same time, amounts to prescribing five. Mr. Canon Mosely, in one of his reports, adduces evidence of the general fact that as you spread the requirements wide so you get shallower or lower results on the average in each head of competition included.

The experienced heads of preparatory schools would, I believe, further agree that it is much better for teaching, and necessary for the avoidance of cram, as I should maintain that it is better for the public or for private service that the requirements should be narrow but deep, rather than wide and shallow. We are not, however, considering the extent of the requirements, but what shall be the subjects of competition, for you may include as many as you please of accomplishments for paper qualifying examinations, whilst you exclude them from competition. We exclude existing acquisitions to be imparted for the future. If a man has this or the other attainment, forming part of a liberal course of education, it is said to be bad to deprive him of the benefit of its estimation. We are, however, considering not what he has but what he ought to have, not what may render him an accomplished member of elegant society, but what will make him a good public servant, or in private service enable him to yield a full equivalent for the pay he receives and to sustain responsibility in leading positions. We shall come to a sounder decision on these questions if considering of professional service for ourselves we consider of the qualities which we may need, and for which we are prepared to pay in case of need. These will be the qualities most required for the service of the state.

Considering how we may best narrow the heads of competition, I would propose to omit history. A man ought to know the history of his own country, it is said. Yes, but not make a range of the events and characters of

some thousand years of the past, and too much of the bad, the subject of competition, at the expense of proficiency in one or other of the sciences, the purer and the better. Moreover, history as a topic is one great field of cram, of reliance on memory, and of developing.

The next heads which I submit for discussion are the literatures of different countries. Ought not a gentleman to be versed in polite literature, it is said? Certainly; but it is not needful that it should be the subject of competition, at the expense of proficiency in other and indisputably better and more needed subject matters of training. Literature is moreover another great field of cram and dodging examinations, giving opportunities of trick, yielding chances to the idle who have read for amusement over the diligent who have laboured for the serious business of life. The literatures may be left for cultivation to social influences, and to their own attractions and advantages as recreations. As tests, moreover, they are of an inferior order. These two heads being dismissed as subjects of competition, we come to those which are admitted as means of mental training and superior tests of aptitude. First in appointed order are the mathematics. It is submitted that taking them as a main test, whilst the basis of examination is made narrower, it should be made deeper or rather longer, and that double the time should be given to it. This would have the advantage of giving the slow but sure a fairer chance against the quick, and may be the superficial, and would render the examinations less painful to the nervous.

One opinion I find increasing in strength is that greater prominence should be given to the experimental sciences, and that, indeed, for the scientific corps of the army they should be made the chief topic for competition, and of course for preparatory education. The grounds of this opinion are that mental exercises in the supplemental sciences include exercises of the faculties in induction as well as in deduction; that eminence in the pure mathematics has not been in this country or in France accompanied by equal eminence in the public service; that the experimental scientist is non-practical; that if it were put to a chief of engineers, or to a mechanical or eminent civil engineer in this country, which of two competitors he would choose as an assistant, the one who was eminent in mathematics, or the one who was eminent in the experimental sciences, the latter would from experience be the one chosen. I confess that I give a strong preference to the experimental sciences, from what I know of the failures of the French engineers, who are pre-eminent in pure mathematics, and from what I know of the failures of pure mathematicians at home, of which I could give, and have, indeed, elsewhere given examples. As a mental exercise, I must say that I think that exercises in logic might well take the place of much of mathematics, and for this reason—that I find skill in clear logical examination and exposition, and arrangement of business, to be rare qualifications amongst candidates for the public service. But it is impossible to look at French administrative and legislative documents, or at French scientific treatises, without being struck with their logical arrangement and clearness of exposition; and we find in almost every curriculum of a French course of superior education logic placed in a foremost rank, and we see its influence. In olden time, when logic was more cultivated in the English universities, we may trace its influence, in legal and clerical expositions, in greater clearness of arrangement and force of exposition than we now find prevalent.

Keeping in view the general proposition that it is requisite to reduce the topics for competition, there is now presented for consideration which language, dead or living, shall be the subject of pass or merely qualifying examinations, and which the subject of competition as a test of qualifications for the public service. As an officer who has in his time had much to do with the selection of gentlemen, men of liberal education, for first-class officers, and with their subsequent direction, I answer at once the vernacular, for the following reasons:—First, the small

proportion who are found to write the mother tongue well and clearly. Out of several hundred gentlemen, sons of persons of wealth, who were examined for direct commissions in the army, the majority were plucked for bad English, for bad spelling, in fact for want of a common knowledge of the mother tongue. The bad English of the dispatches of generals and superior officers in the Crimean war was notorious. Kings' and Queens' speeches are presentable as examples of bad English. It may be pleaded that all these were not children of the university. But it was a subject of observation that the translation of the university statutes into English sent to the university commissioners, translations by men of high classical attainments, was into English which would not have been creditable to the scholars of a poor grammar school. Mr. D'Orsey, a member of the university, has advocated the urgent necessity of the study of English. In respect to the selection of a language as a mental exercise, the great European philologist, Grim, prefers German to either Greek or Latin, and prefers the English to the German. Dr. Latham and other philologists do the same. On such impartial and competent authority I would rely, making no pretensions to any of my own. Reserving the dead and foreign languages for pass or qualifying examinations, we should reduce the heads of competition from five, including two histories of peoples, and two literatures of peoples, to the vernacular, to mathematics and to the experimental sciences, which I think would be approved by the present state of opinion on the part of those conversant with the subject, including some experienced heads of preparatory schools. By this arrangement cram would be well nigh abolished. The Duke of Cambridge and the Council of Military Education have made important advances in the direction which I advocate. They have separated the literatures from the languages, so as to enable competitors to compete in the languages alone. The results of these advantages have, I believe, been such as to justify and require further advances to be made in the same direction."

AUSTRALIAN EXPLORATION.

The *Times* correspondent from Australia writes:—"Two new rivers have been discovered in Queensland, and, still more important, Mr. Landsborough, the bold and dashing Queensland explorer, arrived in Melbourne about a fortnight back, having completed his expedition clean across the continent (something to the east of Burke's route) from the Gulf of Carpentaria. It was an interesting coincidence that Mr. Landsborough himself was present at the meeting of the Exploration Committee of our Royal Society on the occasion of the presentation by Sir Henry Barkly to John King (the survivor of Burke and Wills's expedition) of the gold watch forwarded to him by the Duke of Newcastle on behalf of the Geographical Society. There was a great gathering on the occasion, including many ladies. Finally and satisfactorily it is now established that the vast interior of this land is *not* a great sandy desert. Mr. Landsborough informs us that on starting he followed up a stream for 150 miles through a fine country, south-westerly, intending, if possible, to reach Stuart's route, but that owing to the time lost through the wreck of the *Firefly* (attendant on the earlier part of the expedition) he was unable to effect this object. He states that he reached the source of this stream; that it commenced with a fine spring, three feet deep, very rapid, and sufficiently strong to turn a wheel. Returning down this stream, he found that at about 80 miles from the Gulf it threw off two streams, the one flowing into the Nicholson river, the other into the Albert river. He then proceeded for the Flinders, having failed to discover the tracks of Burke's party, and followed up that river for 400 miles through what he describes as "magnificent country." At this point the party left the Flinders (which Mr. Landsborough thinks is about 500 miles long), and in about 20 miles reached the watershed of the Thompson

one of the main heads of the Cooper river. Proceeding thence about a hundred miles, he came upon a tree marked by some other explorer, and, although then only about 150 miles from Buake's dépôt, he was obliged, from shortness of supplies, to forego the journey to that place, and therefore he at once struck across about 40 miles for the main head of Cooper's Creek. Reaching this point, the party followed Cooper's Creek until they struck the Warrego, and then followed the Warrego until they came on the Darling. Here, being in settled country, Mr. Landsborough first heard of the fate of the party of poor Burke and Wills. In answer to questions from members of the society, Mr. Landsborough informed them that the most elevated land on the Flinders did not exceed 1,000 feet; that the wet season in tropical Australia began about January; that thunderstorms and rainy weather last until the end of April or beginning of May; that on the heads of the Gregory river the country is of a basaltic character, and on the Flinders quartz and iron bark trees (and therefore, probably, gold) abound. The dividing range between the Flinders and the Cooper's Creek country is estimated as being from 1,000 to 1,500 feet high. Mr. Landsborough said he had no doubt that the rivers on the east side of the range separating the Flinders from the Thompson were supplied by springs. He had never been to the west of the Thompson, and he saw no indications of southern streams. On returning to the Albert river from his expedition to the south-west, he came on another river, well supplied with water. In the water-holes, which he followed down for 70 miles, he found plenty of fish, and he thought these fish came up from rivers further to the south-west; but, as it was the dry season, he could see no water where it had spread for several miles in the wet season. Further down, he had no doubt he should have got on to a large river. The country he passed through "was so well grassed that the horses looked as if they had been stable-fed." So healthy are the shores of the Gulf of Carpentaria that "although living in the open air, and not having the best of food" (as Mr. Landsborough says), the country agreed admirably with him, and there was no fever or ague among any of the party. I have since had a few hours of Mr. Landsborough to myself, and he informs me that he has no doubt that within 12 months the whole of the country between this and the Gulf of Carpentaria will be taken up by settlers. Here, then, covering many degrees of latitude, salubrious, well grassed, and upon the whole much better watered than we had ever before surmised as probable, is the last extensive addition to the habitable world.

Proceedings of Institutions.

LEEDS WEST-RIDING EDUCATIONAL BOARD.—The report of this Board says that it was established in December, 1859, for the purpose of conducting the Examinations which might be held of members of Mechanics' Institutions and others, either by the Society of Arts, the Universities, or similar bodies. The system of Examination and the award of certificates and prizes as a stimulus to education was being largely extended, and it became indispensable to the value attaching to their results that the duty of conducting them should be undertaken by a responsible and impartial Board, comprised of the representatives of Educational Institutions and others interested in the great work of mental cultivation. It is not only designed to give a permanent character to the Examinations, but also to stimulate local efforts, so that a knowledge of the advantages to be gained might be disseminated as widely as possible. It was found that previous efforts in the same direction had been of an ephemeral and isolated character, and security for impartiality as well as systematic action to obtain the greatest possible benefits could only be achieved by the organisation of a united body. The first duty undertaken by the

Board was to conduct the Preliminary Examinations for the Society of Arts in March, 1860, and the Final Examinations in May following. Notice of the several arrangements was forwarded to all the Institutes within a reasonable distance of Leeds, and thirty-two certificates were awarded by the Society of Arts to nineteen candidates. In June, 1860, the Board undertook the management of the Local Examinations of Oxford University, which were held in the Civil Court, at the Leeds Town Hall, under the superintendence of the Rev J. T. B. Landon on the part of the University. This Board offered local prizes, to senior candidates, of £2 for a first-class, and £1 for a second-class certificate, with half the value for every additional certificate gained by each candidate; and to junior candidates, £2 for the first, £1 10s. for every other first-class, and £1 for every second-class certificate. There were fifty-five candidates, and £31 was distributed in prizes. In March, 1861, this Board conducted the Preliminary Examinations of the Society of Arts, and the Final Examinations in the April and May following. The result was the award of thirty-two certificates to twenty-three candidates. In May, 1861, the Oxford University Local Examinations were conducted by this Board, in the Civil Court in the Leeds Town Hall, under the superintendence of the Rev. J. T. B. Landon on the part of the University. There were fifty-five junior and thirteen senior candidates. Four first-class, four second-class, and five third-class certificates were awarded to ten of the senior candidates; and eight first-class, four second-class, and thirty-four third-class certificates were awarded to forty-six junior candidates. The result was eminently satisfactory, the proportion of candidates who passed being eighty-two per cent., or twenty per cent. more than the whole kingdom. In priority of merit one of the junior candidates was No. 1, and one of the senior candidates No. 2 of the whole number examined by the University. The sum of £26 10s. was distributed by this Board in local prizes. In 1861, a Central Committee, consisting of two representatives of each Provincial and District Union and Adult Education Society, four members of the Council of the Society of Arts, the Chairman of the Society's Central Board of Examiners, and six representatives of Local Boards, was established in London in connection with the Society of Arts, the object being to promote uniformity of action, and a fixed standard in the Elementary Examinations of the Provincial and District Unions, Adult Educational Societies and other Local Boards. The duty of the Central Committee was to provide for common use a scheme of two elementary examinations consisting of two sets of papers, one suited for junior, the other for senior candidates, with corresponding forms of certificate to be awarded by the local authority under which the examination has been conducted. As a further privilege the certificate of a senior candidate, of sixteen years of age, is received, without any further previous examination, as a pass to the final Examinations of the Society of Arts, if accompanied by a certificate from the Local Board or Union of the candidate's fitness to be examined in the special subject in the Society of Arts' programme in which the candidate proposes to be examined. The elementary Examinations are held simultaneously, and are open to persons of either sex or any age. As, according to the scheme, the Examinations might be held in any place where candidates presented themselves, under proper supervision, this board obtained the necessary supply of papers and conducted Examinations at the Leeds Mechanics' Institution, Leeds Female Educational Institution, Thirsk Mechanics' Institution, Marske Mutual Improvement Society, Stocksbridge Mutual Improvement Society, and Wilsden Mechanics' Institution, the total number of candidates being 48 seniors and 69 juniors. The treasurer's account shows that the receipts up to December, 1861, have been £188 15s. 10d.; and that there is a balance in hand of £26 12s. 7d.

MEETING FOR THE ENSUING WEEK.

- MON. ... Medical, 83. Clinical Discussion. I. Mr. Everett Hart.
1. "On a Recent Case of Popliteal Aneurism Cured by Flexion, after failure of Pressure." 2. "On an Improved Tourniquet, with Index, and a case in which it was employed."

PATENT LAW AMENDMENT ACT.

APPLICATIONS FOR PATENTS AND PROTECTION ALLOWED.

[From Gazette, October 17th, 1862.]

- Dated 30th July, 1862.*
2157. F. C. Warlich, 10, Alma-terrace, New Cross—Imp. in machinery for dressing and shaping stone. (A com.)
- Dated 18th August, 1862.*
2318. H. Boetius, 9, Roehampton-street, Bessborough-gardens, Pimlico—Imp. in fire-proof materials.
- Dated 22nd August, 1862.*
2348. H. Twelvetees, Bromley, Middlesex—Imp. in the preparation of washing powders, soap powders, and cleansing crystals.
- Dated 29th August, 1862.*
2402. P. W. Mackenzie, New Jersey, and S. W. Smith, Brooklyn, U.S.—Imp. in vehicles to be propelled by the rider.
- Dated 4th September, 1862.*
2444. J. Cook, 9, Fitzroy-place, Kentish Town—Imp. in carriages.
- Dated 17th September, 1862.*
2552. W. Watson and W. H. Watson, Harrogate, Yorkshire—An improved process or processes for the preparation of certain colouring matters from aniline.
- Dated 19th September, 1862.*
2567. W. Tytherleigh, 28A, High-street, Marylebone—An improved heater for ironing or pressing.
- Dated 25th September, 1862.*
2614. F. Tolhausen, 17, Faubourg Montmartre, Paris—An improved steam cultivator. (A com.)
- Dated 26th September, 1862.*
2624. W. Pettet, 11, Bulstrode-street, Middlesex—An improved covering for protecting vessels and forts from shot, shell, and other warlike missiles. (Partly a com.)
- Dated 29th September, 1862.*
2638. R. Griffiths, 69, Mornington-road, Regent's-park—Imp. in the construction of iron ships, and in the method of fastening metal sheathing thereon to keep them from fouling.
- Dated 30th September, 1862.*
2651. R. Hoyle, Newchurch, Lancashire—Imp. in machinery or apparatus for printing surfaces of woollen, mohair, cotton, and other fabrics.
2653. J. L. Hughes, Droitwich-road, Worcester—Imp. in producing ornamental patterns in gold or colour on porcelain, earthenware, glass and enamel.
2655. J. Wright, 12, Copthall-court, Throgmorton-street—An improved rotative travelling crane. (A com.)
- Dated 1st October, 1862.*
2657. P. G. V. Byl, 3, Upper Hyde park-gardens—A power conserving brake for utilising the power expended in stopping or retarding machinery, locomotive or other engines, and vehicles of any description when in motion. (A com.)
2658. R. W. Greenwood and C. J. Marson, 13, Gloster-crescent, Islington—A new and improved mode of using the exhaust steam of steam engines, by reconveying the same into the boiler.
2659. B. Donkin, Bermondsey—Imp. in bearings for shafts, axles, pivots, and sliding surfaces for the purpose of diminishing friction. (A com.)
2661. W. C. Cambridge, Bristol—Improved apparatus for washing clothes, applicable also as a churn.
- Dated 2nd October, 1862.*
2662. J. Gilchrist, Glasgow—Imp. in boring engines such as are used for mining purposes.
2664. W. C. Wilkins, Long Acre—Imp. in gas burners.
2665. E. Suckow and E. Habel, Manchester—Imp. in machinery for preparing, spinning, and doubling fibrous materials.
2666. J. H. Johnson, 47, Lincoln's-inn-fields—Imp. in the permanent way of railways. (A com.)
2667. G. J. Firmin, Millwall, Poplar—Imp. in the treatment of certain salts of potash and lime.

Dated 3rd October, 1862.

2668. F. Ensor, West Bromwich, and W. Payne, Birmingham—A new or improved apparatus for regulating the pressure of steam in steam boilers, and for indicating when the water in steam boilers is too high or too low.
2669. J. Harrop, Manchester, and J. Wadsworth, Salford—Imp. in deodorising refuse, organic, fecal, and urinous matters, and in a method of utilising coal and other ashes, and in machinery or apparatus connected therewith for producing a portable manure therefrom.
2670. T. J. Robotham, Burslem, and E. Oswald, Stoke-upon-Trent—Imp. in apparatus for purifying "glaze," "slip," or other potters' materials.
2671. R. Broadbent, Leeds—Imp. in gas regulators.
2673. W. Clark, 53, Chancery-lane—An improved candlestick. (A com.)
2674. W. E. Gedge, 11, Wellington-street, Strand—An improved suction and lift pump, and apparatus connected therewith. (A com.)
2675. A. Dalrymple, 18, Eyre-street, Sheffield—Imp. in the processes of depositing metals by galvanic action either with or without the aid of galvanic batteries, and in the ornamentation of metal surfaces thereby.
2676. W. E. Gedge, 11, Wellington-street, Strand—An improved marquetry or veneer saw, and machinery or apparatus connected therewith. (A com.)
2677. T. Greenwood, Leeds—Improved machinery for cutting staves.
- Dated 4th October, 1862.*
2678. J. Lee and W. Lee, Humberstone-road, Leicester—Imp. in traction engines and boilers for traction, locomotive, and other purposes.
2679. W. M. Muntz, Millbrook, Hants—Imp. in armour for the protection of ships of war, and other vessels and fortifications, from the effects of cannon shot and other projectiles.
2680. A. Barclay, Caledonia Foundry, Kilmarnock—Imp. in printing textile materials and fabrics, and in machinery therefor.
2681. W. E. Gedge, 11, Wellington-street, Strand—Improved means or apparatus by the use of which pierced or perforated cocoons may be spun. (A com.)
2682. S. Amphet, Birmingham—Au imp. or imps. in ornamenting surfaces of wood.

PATENTS SEALED.

[From Gazette, October 17th, 1862.]

- | | |
|--|---|
| <i>17th October.</i> | 1215. J. Shaw. |
| 1136. R. Dennison. | 1223. E. A. L. Negretti and J. W. Zambra. |
| 1141. R. Stuart, G. Stuart, and H. Hill. | 1228. J. G. N. Alleyne. |
| 1142. B. Rhodes. | 1233. A. Boyle and T. Warwick. |
| 1146. W. Rose. | 1263. M. Henry. |
| 1151. A. P. Tronchon. | 1275. J. Oxley. |
| 1153. E. H. C. Monckton. | 1324. P. V. Lefebvre. |
| 1159. R. A. Brooman. | 1329. T. Wilson. |
| 1161. T. Attwood. | 1361. T. Markland. |
| 1165. C. C. Creeke. | 1364. N. Wood and J. Stockley. |
| 1166. T. Lea and S. Smith. | 1900. C. Callebaut. |
| 1167. E. H. C. Monckton. | 1912. W. Easton and G. Donkin. |
| 1177. W. Moir. | 1990. E. Townsend. |
| 1178. G. N. Bates. | 2052. O. F. Morrill. |
| 1180. W. Carpenter. | 2067. W. Tranter. |
| 1184. A. Hodgkinson. | 2075. W. Clark. |
| 1186. G. T. Bousfield. | 2097. W. Clark. |
| 1191. J. Endean. | 2104. H. Rawson and F. Staples. |
| 1196. J. Winsborrow. | 2256. C. A. Wheeler. |
| 1197. G. Davies. | 2267. J. Cooper. |
| 1201. F. Dangerfield. | |

PATENTS ON WHICH THE STAMP DUTY OF £50 HAS BEEN PAID.

[From Gazette, October 21st, 1862.]

- | | |
|--|---------------------------------|
| <i>October 14th.</i> | <i>October 16th.</i> |
| 2357. J. H. Brown. | 2364. S. Newberry and H. Moore. |
| <i>October 15th.</i> | 2385. A. S. Rott. |
| 2380. J. Higgins and T. S. Whitworth. | 2448. J. W. Hackworth. |
| <i>October 18th.</i> | |
| 2396. J. Bruckshaw, H. Bruckshaw, and W. S. Underhill. | 2398. R. Hobson. |
| | 2414. P. Jones. |
| | 2462. R. A. Brooman. |

PATENTS ON WHICH THE STAMP DUTY OF £100 HAS BEEN PAID.

[From Gazette, October 21st, 1862.]

- | | |
|--|----------------------|
| <i>October 13th.</i> | <i>October 16th.</i> |
| 2354. T. Valentine, D. Foster, and G. Haworth. | 2336. S. Statham. |
| <i>October 15th.</i> | <i>October 18th.</i> |
| 2311. E. Wilkinson. | 2345. W. Basford. |

LIST OF DESIGNS FOR ARTICLES OF UTILITY REGISTERED.

No. in the Register.	Date of Registration.	Title.	Name.	Address.
4515	Oct. 15	{ Improved Internal Toothed Wheel for Reaping Machines }	Adam Carlisle Bamlett...	Middleton Tyas, near Richmond, Yorks.
4516	,, 18		George Frederick Busbridge..	East Malling Mills, Kent.